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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,461	07/18/2003	Chang-Soo Kim	122988-05007303	1143

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MAYER, BROWN, ROWE & MAW LLP
1909 K STREET, N.W.
WASHINGTON, DC 20006

EXAMINER

MASDON, DAVID T

ART UNIT PAPER NUMBER

2188

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/621,461	Applicant(s) KIM ET AL.	
	Examiner David Masdon	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/18/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) was submitted on 7/18/2003. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

2. The drawings filed on 7-18-2003 have been approved by the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2 rejected under 35 U.S.C. 102(e) as being anticipated by O'Connell.
(US 6,678,788)

With regard to claim 1, O'Connell discloses a file level striping apparatus comprising:

a number of disks, [(plurality of disk drives) column 8, lines 53-65]

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accessed with physical block numbers, for storing information actually; [(data stored on disks in blocks) column 31, lines 29-46]

a volume manager logically grouping a number of disks to form a single large logical volume, wherein the volume manager records the information managing the logical volume to participating disks and manages it; and [(topologically organized as a plurality of units of storage space) column 4, lines 50 – column 5, lines 1-40; specifically column 4, lines 60-64]

a file system, which recognizes the logical volume as a single storage device, for generating files on logical volume and performing I/O operations for the generated files with logical block numbers which are applied the logical volume. [(topological data formatter to perform categorization) column 4, lines 50 – column 5, lines 1-40; specifically column 4, line 64- column 5, line 4]

Claim 2 is rejected with same rationale as claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over O'Connell (US 6,678,788) as applied to claim 1 above and in view of Fish et al (US 5,828,876)

O'Connell does not disclose expressly a volume label area for storing information generated by the volume manager and required managing the logical volume; a free space bitmap area controlling block allocation; a mapping table area for storing information about the correspondence relationship of physical blocks and the logical blocks; and a data area, which is a collection of physical blocks for storing data, comprising the remaining space of said disk except for a volume header area including the volume label area, the free space bitmap area and the mapping table area.

However, Fish et al discloses a volume label area for storing information generated by the volume manager and required managing the logical volume; a mapping table area for storing information about the correspondence relationship of physical blocks and the logical blocks. [(superblocks containing high level information about the system; including file system name, logical block size, number of data blocks) column 4, line 33 – column 5, line 67] Fish et al also discloses a free space bitmap area controlling block allocation [(a free block bit map containing a list of all the free space) column 8, lines 10-67], and a data area, which is a collection of physical blocks for storing data, comprising the remaining space of said disk except for a volume header area including the volume label area, the free space bitmap area and the mapping table area [(data blocks to store data) column 9, lines 1-5]

O'Connell and Fish et al are analogous art because they are from same field of endeavor, namely file systems. At the time of the invention it would have been obvious

to a person of ordinary skill in the art to incorporate the file system of Fish et al into the system of O'Connell. The motivation for doing so would have been to have had an improved file system for managing data storage. (Fish et al; column 1, lines 4-9)

7. Claims 4-5, 7 rejected under 35 U.S.C. 103(a) as being unpatentable over O'Connell (US 6,678,788) as applied to claim 1 and in view of Frey, Jr. (US 6,742,137)

As per claim 4, O'Connell discloses storage allocation based on an external factor. (column 32, lines 29-50) This is identical to the applicant's claim of allocating a block based on the last disk ID. O'Connell does not disclose expressly adding an option indicating whether or not to support file level striping to the file creation interface in the file system; extending an inode structure to include a last disk ID field; initializing the last disk ID when a file is created in the file system; allocating a physical block based on the last disk ID when a physical block allocation is required at the time of file I/O request in the file system; and modifying last disk ID value to reflect the physical block allocation made by the volume manager. However, Frey, Jr. discloses adding an option indicating whether or not to support file level striping to the file creation interface in the file system. [(a technique of data storage that includes an option to create a file object with data striping) column 4, lines 6-32] Also, Frey, Jr. discloses extending an inode structure to include a last disk ID field; initializing the last disk ID when a file is created in the file system; allocating a physical block based on the last disk ID when a physical block allocation is required at the time of file I/O request in the file system; and modifying last

disk ID value to reflect the physical block allocation made by the volume manager.

[(objects stored and retrieved by memory labels) column 3, lines 50-61]

O'Connell and Frey, Jr. are analogous art because they are from the same field of endeavor, namely storage systems. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the optional striping of Frey, Jr. into the system of O'Connell. The motivation for doing so would have been to create a more flexible computer storage system. (Frey, Jr.; column 2, lines 46-58)

Claims 5, 7 are rejected with same rationale as claim 4. O'Connell discloses a data being stored from a number of disks. (column 5, lines 53-64) It is inherent that a storage system utilizes some kind of numbering and labeling system when accessing the drives. Frey, Jr. discloses indicating file striping when creating a file object. It is inherent that indication of striping requires a system to show not only support for striping, but also show no support for file support. At the time of invention it would have been obvious to a person of ordinary skill in the art to have a flag or bit or a specific value (example -1) as an indicator to show a condition.

8. Claim 6 rejected under 35 U.S.C 103 (a) as being unpatentable over O'Connell (US 6,678,788) and Frey, Jr. (US 6,742,137) as applied to claim 4 above, and in further view of Fujimoto et al (US 6,377,500).

O'Connell and Frey, Jr. does not disclose expressly the file level striping method of claim 5, wherein the random integer is selected to prevent data block allocation being

concentrated to a disk corresponding to the initial value of the last disk ID when the initial values the last disk ID of all the files supporting the file level striping are set constant at a specific value. However, Fujimoto et al discloses preventing data from being concentrated on the same block. (column 20, lines 32-41)

O'Connell and Frey, Jr. and Fujimoto et al are analogous art because they are from same field of endeavor, namely a memory system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the prevention of data concentration of Fujimoto et al into the system of O'Connell and Frey, Jr. The motivation for doing so would have been to average out the usage of the blocks. (Fujimoto et al; column 20, lines 32-41)

9. Claims 8-10 rejected under 35 U.S.C 103 (a) as being unpatentable over O'Connell (US 6,678,788) and Frey, Jr. (US 6,742,137) as applied to claim 4 above, and in further view of Machiguchi (US 6,064,635).

As per claim 8, O'Connell and Frey, Jr. do not disclose expressly requesting a file I/O operation; determining which logical block corresponds requested file I/O operation; requesting the volume manager or a lower level I/O system to perform said determined logical block I/O operation; performing an address mapping process in order to determine which disk and which physical block therein correspond to said logical block; performing I/O operation for the physical block determined to correspond to said logical block at the address mapping process; checking the value of the last disk ID of

the inode corresponding to the file if physical block allocation turns out to be required since the logical block is used for the first time at the address mapping process; selecting the disk of a number next to the value of last disk ID 601 if the value of the last disk ID 601 turns out to be in the range from 0 to the number the disks associated with the logical volume minus 1; performing physical block allocation referring to the free space bitmap of said selected disk; updating the mapping table with the allocation result and performing I/O operation for the file on the physical block; changing the value of the last disk ID if I/O operation on the physical block is completed; and performing I/O operations repeatedly on the physical block for the physical block allocation to be distributed uniformly across the whole disks. However, Machiguchi discloses a system that determines if a disk can write by checking the volume ID. (column 6, line 65 – column 7, line 10) This is identical to what applicant teaches about checking the value of the last disk ID. Also, Machiguchi discloses selecting a desirous recording medium, (column 2, lines 16-34) and means for performing I/O. (column 3, line 45 – column 4, line 2) Machiguchi discloses a volume tag that defines an element address for indicating a storage address (column 4, lines 22-28). This labeling process is identical to what applicant claims as the address mapping process. Machiguchi also teaches a process to defining a volume ID, (column 4, lines 28-35) identical to the updating of the mapping table, to which applicant claims. Machiguchi also discloses managing the space on the disks, (column 4, lines 40-52) which is identical to the block allocation that applicant teaches.

O'Connell and Frey, Jr. and Machiguchi are analogous art because they are from same field of endeavor, namely storage mediums. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the I/O operations of Machiguchi into the system of O'Connell and Frey, Jr. The motivation for doing so would have been to create a more volatile storage system. (Machiguchi; column 1, lines 8-15)

As per claim 9, O'Connell discloses storage allocation based on an external factor, which is identical to the method of applicant of referring to a variable if the disk ID equals -1. (column 32, lines 29-50)

As per claim 10, O'Connell discloses a labeling system for accessing drives, which is identical to what applicant teaches. (column 5, lines 53-64) Also, claim 10 is rejected with same rationale as claim 5.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gaither et al	6,195,650
Aoki et al	6,233,654

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Masdon whose telephone number is (571)272-6815. The examiner can normally be reached on Monday - Friday, 7am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571)272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM

Mano Padmanabhan
3/20/06

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER